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INDOOR AIR QUALITY AND MECHANICAL VENTILATION

CERTIFICATE OF VERIFICATION		CF3R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

Title 24, Part 6, Section 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. ***Equation and table numbering on this form corresponds to the numbering for that information in the published ANSI/ASHRAE Standard 62.2-2010.***

A. Dwelling Mechanical Ventilation - General Information		
01	Dwelling Unit Name	
02	Building Type	
03	Project Scope	
04	Total Conditioned Floor Area of Dwelling Unit (For addition projects the conditioned floor area equals existing area plus addition area)	
05	Number of Bedrooms in Dwelling Unit (For addition projects the number of bedrooms equals the existing bedrooms plus addition bedrooms)	
06	Ventilation Operation Schedule	
07	Whole-Building Ventilation Rate Calculation Method	
08	Whole Building Ventilation System Type	
09	IAQ Fan Location	

MCH-27d - Intermittent Ventilation Airflow - Total Ventilation Rate Method

B. Continuous Ventilation Airflow – Total Vent Rate Method A mechanical supply system, exhaust system, or combination thereof shall provide whole-building ventilation with outdoor air each hour at no less than the rate in 62.2 equation 4.7.		
01	Total Required Ventilation Rate (fan + infiltration), (Q_{tot})	
02	CFM50 – Depressurization	
03	Equivalent Leakage Area Depressurization	
04	CFM50 – Pressurization	
05	Equivalent Leakage Area Pressurization	
06	Equivalent Leakage Area Used for Ventilation	
07	What is the vertical distance from the lowest above-grade floor to the highest ceiling in feet?	
08	What is the weather and shielding factor (wsf) for the city listed in 62.2 Appendix X Table X1 ?	
09	Normalized Leakage (NL)	
10	Ventilation Provided by Infiltration In (Q_{inf})	
11	Required Continuous Whole-Building Ventilation Rate (Q_{fan})	

C. Intermittent Ventilation The effective ventilation rate of an **intermittent** system is the combination of its delivered capacity, its fractional on-time, cycle time, and the ventilation effectiveness from Table 4.2.		
01	In a single on off cycle, what is the ON time in hours?	
02	In a single on off cycle, what is the OFF time in hours?	
03	Fan Cycle Time Check	
04	Daily Fractional On Time (*f* used in Table 4.2)	
05	Daily Fractional On Time Check	
06	Turnover (N used in Table 4.2)	
07	Ventilation Effectiveness (e, from Table 4.2)	
08	Intermittent Ventilation Rate	
09	Installed Intermittent Ventilation Rate	
10	System Fan Efficacy Compliance Status	
11	System Fan Efficacy Compliance	

CERTIFICATE OF VERIFICATION		CF3R-MCH-27-H
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Project Name:	Enforcement Agency:	Permit Number:
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D. Compliance Statement	
01	

E. Determination of HERS Verification Compliance

All applicable sections of this document shall indicate compliance with the specified verification protocol requirements in order for this Certificate of Verification as a whole to be determined to be in compliance.

01	

CERTIFICATE OF VERIFICATION		CF3R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 3 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Verification documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Date Signed:
Address:	CEA/HERS Certification Information (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Verification is true and correct.
2. I am the certified HERS Rater who performed the verification identified and reported on this Certificate of Verification (responsible rater).
3. The installed features, materials, components, manufactured devices, or system performance diagnostic results that require HERS verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, and the requirements specified on the Certificate of Compliance for the building approved by the enforcement agency.
4. The information reported on applicable sections of the Certificate(s) of Installation (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) approved by the enforcement agency.
5. I will ensure that a registered copy of this Certificate of Verification shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Verification is required to be included with the documentation the builder provides to the building owner at occupancy.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION	
Company Name (Installing Subcontractor, General Contractor, or Builder/Owner):	
Responsible Builder or Installer Name:	CSLB License:
HERS PROVIDER DATA REGISTRY INFORMATION	
Sample Group Number (if applicable):	Dwelling Test Status in Sample Group (if applicable):
HERS RATER INFORMATION	
HERS Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this HERS Provider:	Date Signed:

CF3R-MCH-27d-H User Instruction

Section A. General Information

1 This information is automatically pulled from the CF1R. This is the unique identifier for this dwelling unit. Needed mostly for multifamily dwelling units. Ventilation is calculated and provided for each dwelling unit individually.
2 This information is automatically pulled from the CF1R. Choices are "single family" and "low-rise multifamily".
3 This information is automatically pulled from the CF1R. Choices are "New Construction" and "Addition greater than 1,000 ft^2".
4 Value to be entered in the field equals the conditioned floor area of the space for which the ventilation is being calculated, in ft^2. For additions over 1000 ft^2, this will be the floor area of the existing home plus the addition.
5 Value to be entered in the field equals the number of bedrooms in the home. For additions over 1,000 ft^2, this will be the number of bedrooms in the existing home plus the number of bedrooms in the addition.
6 Select the Ventilation Operation Schedule method used from the choices provided:
- Continuous (the fan that provides ventilation will run 24/7)
- Intermittent (the fan that provides ventilation will be on some of the time and off some of the time)

7 Select the Whole Building Ventilation Rate Calculation Method from the choices provided:
- Fan Ventilation Rate Method (only assumes ventilation from the ventilation fan)
- Total Ventilation Rate Method (assumes that some ventilation is provided by infiltration)

8 Select the Whole Building Ventilation System Type from the choices provided:
- Standalone – Exhaust (ventilation fan[s] push air out of the house)
- Standalone – Supply (ventilation fan[s] push air into house)
- Standalone - Balanced (ventilation fan[s] push air into AND out of the house in equal amounts)
- Central Fan Integrated – CFI (central space condition system fan is used to pull air into the house) Note: these may not run continuously. If "Continuous" is chosen in A06 an error message will be shown.

9 This information is automatically pulled from the CF2R.

Section B. Whole Building Continuous Ventilation – Total Ventilation Rate Method

1. This value is automatically calculated using 62.2 equation 4.2a. The equation used to calculate this value in the field equals:
   a. If A02= Single Family then [(0.03 x conditioned floor area A04) + 7.5(Number of bedrooms A05 + 1)] = Required Continuous Whole-Building Ventilation Rate
   b. If A02= Multifamily then [(0.05 x conditioned floor area A04) + 7.5(Number of bedrooms A05 + 1)] = Required Continuous Whole-Building Ventilation Rate
2. This information is automatically pulled from the registered MCH-24 for this dwelling unit. Note: The Total Ventilation Rate Method requires specific infiltration measurements that must be documented on either a MCH-24.
3. This value is automatically calculated. The equation used to calculate this value in the field equals: (CFM50 B02 x 0.055)/144 = Equivalent Leakage Area (ELA).
4. This information is automatically pulled from the registered MCH-24 for this dwelling unit. Note: The Total Ventilation Rate Method requires specific infiltration measurements that must be documented on either a MCH-24.
5. This value is automatically calculated. The equation used to calculate this value in the field equals: (CFM50 B04 x 0.055)/144 = Equivalent Leakage Area (ELA).
6. Calculated value. This is the average of the pressurization and depressurization equivalent leakage areas.
7. User entered value. Enter the vertical distance from the lowest above-grade floor to the highest ceiling, in feet.
8. User entered value. Enter the Weather Shielding Factor (wsf) from 62.2 Appendix X Table X1.

NORMATIVE APPENDIX X:
INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)
TABLE X1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
690150	0.5	Twentynine Palms	34.3	–116.17	California
722860	0.43	March AFB	33.9	–117.25	California
722868	0.45	Palm Springs Intl	33.83	–116.50	California
722869	0.42	Riverside Muni	33.95	–117.45	California
722880	0.39	Burbank–Glendale–Pasadena AP	34.2	–118.35	California
722885	0.39	Santa Monica Muni	34.02	–118.45	California
722886	0.39	Van Nuys Airport	34.22	–118.48	California
722895	0.55	Lompoc (AWOS)	34.67	–120.47	California
722897	0.51	San Luis Co Rgnl	35.23	–120.63	California
722899	0.45	Chino Airport	33.97	–117.63	California
722900	0.38	San Diego Lindbergh Field	32.73	–117.17	California
722903	0.39	San Diego/Montgomery	32.82	–117.13	California

NORMATIVE APPENDIX X:
INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)
TABLE X1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
722904	0.4	Chula Vista Brown Field NAAS	32.58	–116.98	California
722906	0.39	San Diego North Island NAS	32.7	–117.20	California
722926	0.4	Camp Pendleton MCAS	33.3	–117.35	California
722927	0.38	Carlsbad/Palomar	33.13	–117.28	California
722930	0.39	San Diego Miramar NAS	32.87	–117.13	California
722950	0.42	Los Angeles Intl Arpt	33.93	–118.40	California
722956	0.38	Jack Northrop Fld H	33.92	–118.33	California
722970	0.38	Long Beach Daugherty Fld	33.83	–118.17	California
722976	0.34	Fullerton Municipal	33.87	–117.98	California
722977	0.36	Santa Ana John Wayne AP	33.68	–117.87	California
723805	0.51	Needles Airport	34.77	–114.62	California
723810	0.59	Edwards AFB	34.9	–117.87	California
723815	0.58	Daggett Barstow–Daggett AP	34.85	–116.80	California
723816	0.62	Lancaster Gen Wm Fox Field	34.73	–118.22	California
723820	0.57	Palmdale Airport	34.63	–118.08	California
723830	0.68	Sandberg	34.75	–118.72	California
723840	0.43	Bakersfield Meadows Field	35.43	–119.05	California
723890	0.45	Fresno Yosemite Intl AP	36.78	–119.72	California
723895	0.42	Porterville (AWOS)	36.03	–119.07	California
723896	0.43	Visalia Muni (AWOS)	36.32	–119.40	California
723910	0.45	Point Mugu Nf	34.12	–119.12	California
723925	0.44	Santa Barbara Municipal AP	34.43	–119.85	California
723926	0.43	Camarillo (AWOS)	34.22	–119.08	California
723927	0.45	Oxnard Airport	34.2	–119.20	California
723940	0.52	Santa Maria Public Arpt	34.92	–120.47	California
723965	0.53	Paso Robles Municipal Arpt	35.67	–120.63	California
724800	0.55	Bishop Airport	37.37	–118.35	California
724815	0.46	Merced/Macready Fld	37.28	–120.52	California
724830	0.51	Sacramento Executive Arpt	38.5	–121.50	California
724837	0.45	Beale AFB	39.13	–121.43	California
724838	0.5	Yuba Co	39.1	–121.57	California
724839	0.51	Sacramento Metropolitan AP	38.7	–121.58	California
724915	0.49	Monterey Naf	36.6	–121.87	California
724917	0.54	Salinas Municipal AP	36.67	–121.60	California
724920	0.5	Stockton Metropolitan Arpt	37.9	–121.23	California
724926	0.47	Modesto City–County AP	37.63	–120.95	California
724927	0.53	Livermore Municipal	37.7	–121.82	California
724930	0.54	Oakland Metropolitan Arpt	37.72	–122.22	California
724935	0.47	Hayward Air Term	37.67	–122.12	California
724936	0.53	Concord–Buchanan Field	38	–122.05	California
724940	0.6	San Francisco Intl AP	37.62	–122.40	California
724945	0.48	San Jose Intl AP	37.37	–121.93	California
724955	0.55	Napa Co. Airport	38.22	–122.28	California
724957	0.49	Santa Rosa (AWOS)	38.52	–122.82	California
725845	0.44	Blue Canyon AP	39.3	–120.72	California
725846	0.66	Truckee–Tahoe	39.32	–120.13	California
725847	0.64	South Lake Tahoe	38.9	–120.00	California
725905	0.47	Ukiah Municipal AP	39.13	–123.20	California
725910	0.5	Red Bluff Municipal Arpt 40.15 –122.25 California	40.15	–122.25	California
725920	0.47	Redding Municipal Arpt 40.52 –122.	40.52	–122.32	California
725945	0.56	Arcata Airport 40.98 –124.10 California	40.98	–124.10	California

NORMATIVE APPENDIX X:

INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)

TABLE X1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
725946	0.6	Crescent City Faa Ai 41.78 –124.2	41.78	–124.23	California
725955	0.55	Montague Siskiyou County AP 41.78 –122.47 California	41.78	–122.47	California
725958	0.59	Alturas 41.50 –120.5	41.5	–120.53	California
745090	0.45	Mountain View Moffett Fld NAS	37.4	–122.05	California
745160	0.67	Travis Field AFB	38.27	–121.93	California
746120	0.52	China Lake Naf	35.68	–117.68	California
747020	0.5	Lemoore Reeves NAS	36.33	–119.95	California
747185	0.46	Imperial	32.83	–115.58	California
747187	0.46	Palm Springs Thermal AP	33.63	–116.17	California
747188	0.48	Blythe Riverside Co Arpt	33.62	–114.72	California

9. This value is automatically calculated using 62.2 equation 4.5. The equation used to calculate this value in the field equals: [1,000 x (Equivalent Leakage Area (ELA) B06/ conditioned floor area A04) x (Vertical Distance B07/8.2)^0.4]= Normalized Leakage (NL).
10. This value is automatically calculated using 62.2 equation 4.6a. The equation used to calculate this value in the field equals: (Normalized Leakage (NL) B09 x conditioned floor area A04)/7.3= Ventilation Provided by Infiltration in (CFM).
11. This value is automatically calculated using 62.2 equation 4.7. It is the difference between the total required ventilation and the ventilation provided by infiltration. The equation used to calculate this value in the field equals: (Required Continuous Whole-Building Ventilation Rate B01 - Ventilation Provided by Infiltration B10 = Required Continuous Whole-Building Ventilation Rate of the fan in (CFM).

Section C. Intermittent Ventilation

1. Intermittent ventilation requires controls that ensure a regular operating schedule every 24 hours. Within a 24 hour period there will be one or more regular on off cycles. For a single on off cycle, enter the ON time in hours. This value will be verified by a HERS rater.
2. Intermittent ventilation requires controls that ensure a regular operating schedule every 24 hours. Within a 24 hour period there will be one or more regular on off cycles. For a single on off cycle, enter the OFF time in hours. This value will be verified by a HERS rater.
3. This row performs an automatic check. The intermittent ventilation system must operate at least once every 24 hours. For this to occur, the on time plus the off time in a single on off cycle must be less than 24 hours. If this is true, "OK" will appear. If this is not true, an error will appear here and correct values will need to be entered into C01 and C02. The equation used to calculate this value in the field equals: Time on in hours C01 + Time off in hours C02.
4. This value is automatically calculated. It is the daily fractional on time (*f*) used in 62.2 Table 4.2. A value of 0.60 means that in a 24 hour period the fan will run 60% of the time. The equation used to calculate this value in the field equals: On time in Hours C01/(On time in Hours C01 + Off time in Hours C02)= Daily fractional on time (decimal)
5. This row performs an automatic check. The ventilation system must operate at least 10% of the time. C04 must be greater than or equal to 0.10. If this is true, "OK" will appear. If this is not true, an error message will appear here and correct values will need to be entered into C01 and C02.
6. This value is automatically calculated. It is the turnover (N) used in 62.2 Table 4.2. The equation used to calculate this value in the field equals: [12.8 x Continuous Whole-Building Ventilation Rate B01 x (On time in Hours C01 + Off time in Hours C02)]/ Conditioned floor area of dwelling unit row A04= Turnover N
7. User entered value from Table 4.2. Use the daily fractional time (*f*) from C04 and the turnover (N) from C06 to determine the ventilation effectiveness value (e) from 62.2 Table 4.2.

TABLE 4.2

Mechanical Ventilation Effectiveness for Intermittent Fans

	Turnover, N														
Fractional On-Time, f	0	1	1.5	2	2.5	3	3.5	4	5	6	8	12	20	40	100+
0.00	1.00	0.95	0.88	0.78	0.60	0.00									
0.05	1.00	0.96	0.90	0.81	0.67	0.41	0.00								
0.10	1.00	0.96	0.91	0.83	0.72	0.55	0.21	0.00							
0.15	1.00	0.96	0.92	0.85	0.76	0.63	0.44	0.18	0.00						
0.20	1.00	0.97	0.93	0.87	0.79	0.69	0.56	0.40	0.03	0.00					
0.25	1.00	0.97	0.94	0.89	0.82	0.74	0.64	0.53	0.26	0.02	0.00				
0.30	1.00	0.98	0.95	0.90	0.85	0.78	0.71	0.62	0.42	0.24	0.00				
0.35	1.00	0.98	0.95	0.92	0.87	0.82	0.76	0.69	0.54	0.39	0.14	0.00			
0.40	1.00	0.98	0.96	0.93	0.89	0.85	0.80	0.75	0.63	0.52	0.32	0.02	0.00		
0.45	1.00	0.99	0.97	0.94	0.91	0.88	0.84	0.79	0.70	0.61	0.45	0.21	0.00		
0.50	1.00	0.99	0.97	0.95	0.93	0.90	0.87	0.83	0.76	0.69	0.57	0.37	0.13	0.00	0.00
0.60	1.00	0.99	0.98	0.97	0.96	0.94	0.92	0.90	0.86	0.81	0.74	0.61	0.45	0.27	0.14
0.70	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.94	0.92	0.90	0.85	0.78	0.68	0.55	0.46
0.80	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.97	0.96	0.94	0.90	0.85	0.77	0.70
0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.97	0.96	0.93	0.88
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

8. This value is automatically calculated using 62.2 equation 4.8. It represents the required airflow in cfm that must be delivered during the ventilation system ON times. This value will be verified by a HERS rater. The equation used to calculate this value in the field equals: Continuous Whole-Building Ventilation Rate B01/(Daily fractional on time C04 x ventilation effectiveness value C07= required Intermittent ventilation rate (CFM).
9. User entered value equals the installed intermittent ventilation rate in (CFM). This value will be field verified by a HERS Rater.
10. This information is automatically pulled from the registered MCH-22. Note: this line only visible if CFI System selected in A08.
11. This information is automatically calculated based on C10. Note: this line only visible if CFI System selected in A08